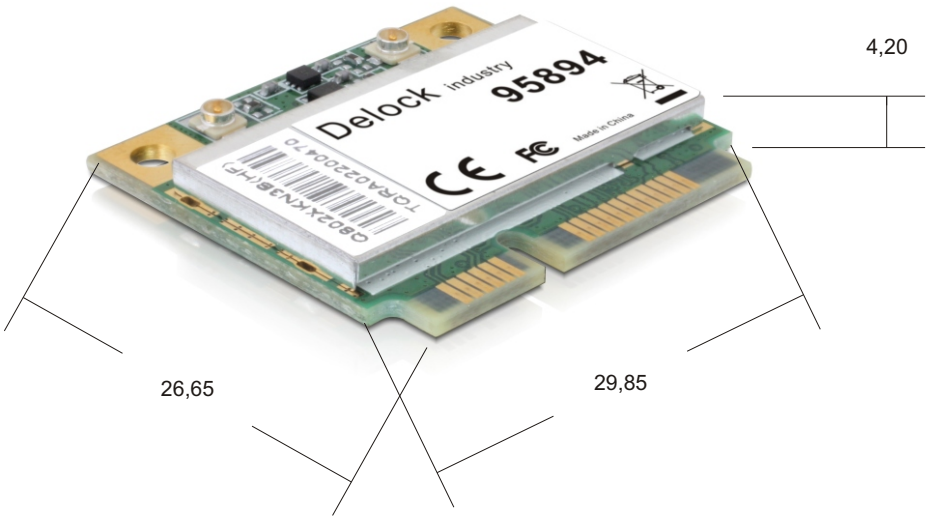
Specification

95894

Delock industry mini PCI Express WLAN+Bluetooth module



date: 25.09.2010

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Device overall description

The 95894 is designed to provide wireless LAN and Bluetooth function on a small form factor with PCI Express interface for wireless LAN and USB interface for Bluetooth to the host system. The interface of Bluetooth is full compliant with USB V1.1 and compatible with USB V2.0 full speed (12Mbits/s). The wireless LAN function is based on Ralink RT3090 MAC/BBP/transceiver and high gain power amplifier, fully comply with IEEE 802.11n and IEEE 802.11 b/g standards. The Bluetooth function is based on CSR BlueCore4-ROM (PC08 ROM) single chip Bluetooth system; witch implements the full speed class 2 Bluetooth operations with full 7 slave Piconet support.

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Features

Wireless LAN features
- Ralink RT3090 MAC/BBP/transceiver
- 1T1R modes
- 11b: 1,2,5.5,11Mbps
- 11g: 6,9,12,18,24,36,48,54Mbps
- 11n: legacy, mixed and green field modes support 20/40MHz Bandwidth MCS0-7(150Mbps PHY rate support)
- Reverse direction grant data flow
- Frame aggregation
- Block Ack
- Hardware WEP, TKIP, AES engines
- Cisco CCX support
- PCI Express 1.1

Bluetooth features
- CSR BlueCore4-ROM (PC08 ROM) single chip Bluetooth system
- Bluetooth specification V2.1+EDR and 3.0+HS compliant support
- Class 2 Bluetooth operations with full 7 slave Piconet support.
- Full speed USB interface compliant with USB V1.1 and compatible with USB V2.0

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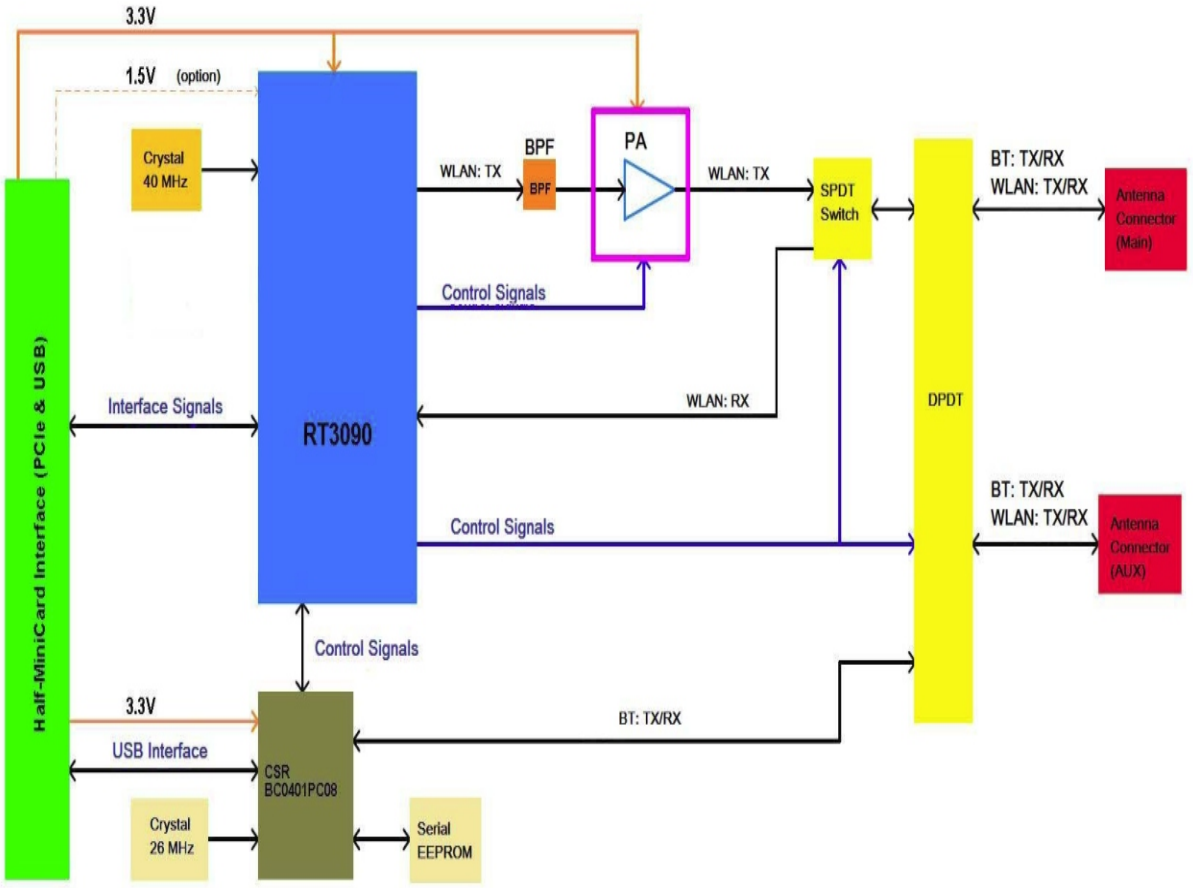
Block diagram

RT3090:

Ralink, wireless LAN integrated medium access controller with baseband processor, and 2.4GHz transceiver

BlueCore4 (PC08 ROM):

CSR single ship radio and based band IC for Bluetooth 2.4GHz systems including enhanced data rates (EDR) to 3Mbits/s.



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Channel assignment

Wireless LAN channel assignment

Channel	Channel frequenc y	FCC (US)	IC (CA)	ETSI (EU)	Japan JP)
1	2412 Mhz	x	x	x	x
2	2417 Mhz	x	x	x	x
3	2422 Mhz	x	x	x	x
4	2427 Mhz	x	x	x	x
5	2432 Mhz	x	x	x	x
6	2437 Mhz	x	x	x	x
7	2442 Mhz	x	x	x	x
8	2447 Mhz	x	x	x	x
9	2452 Mhz	x	x	x	x
10	2457 Mhz	x	x	x	x
11	2462 Mhz	x	x	x	x
12	2467 Mhz			x	x
13	2472 Mhz			x	x
14	2484 Mhz				x

KEY:
US = United States, CA = Canada, EU = European Countries (except France and Spain) JP = Japan
Many countries and region are currently revising the channel assignment. V = supported

Bluetooth channel assignment

country	freq. range	RF channel
Europe* & USA	2400~2483.5MHz	Freq. = 2402 + k MHz k = 0~78
Japan	2400~2483.5MHz	Freq. = 2402 + k MHz k = 0~78

Most Europe area except Spain and France

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Security
• Complete security features - WEP 64/128, WPA, WPA2, 802.1x, and 802.11i
• Cisco CCx compliant

Certification
• WHQL
• Cisco CCX
• Wi-Fi certification: 802.11 b/g, WPA, WPA2, WMM, WMM-PS

Bluetooth SIG listing
Bluetooth SIG controller subsystem: B016406
Bluetooth SIG Host subsystem: B016464

Software and OS support
Operating System: Windows 7, Vista and Windows XP available

Bluetooth support profile
Windows 7/Vista/XP SP3 native built-in driver support profiles – DUN, HCRP, HID, OPP, PAN-U, SPP

Motorola Bluetooth stack included profiles- A2DP, AVRCP, BIP, BPP, DUN, FTP, FAX, GAP , GAVDP, GOEP, HCRP, HFP, HID, HSP, OPP, PAN, SDAP, SPP and SYNC.

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WLAN RF characteristics

Note: while Bluetooth is in idle mode

Plug and Play compatible		no		
internal antenna impedance		50		ohms
operating temperature range	0		65	°C
storage temperature range	-10		85	°C
supply voltage	3	3,3	3,6	V
RX supply current (CCK)	242	252	262	mA
RX supply current 54Mbps	260	270	280	mA
RX supply current 150Mbps	297	307	317	mA
TX supply current (CCK)	323	333	343	mA
TX supply current 54Mbps	276	286	296	mA
TX supply current 150Mbps	260	270	280	mA
radio off current and BT off	66	76	86	mA
RX sensitivity, (11b, 11 Mbps)		-86		dBm
RX sensitivity, (11g, 54 Mbps)		-70		dBm
RX sensitivity, (11n, 150 Mbps)		-64		dBm
TX output power (11b, 11 Mbps)		16,8		dBm
TX output power (11g, 54 Mbps)		13,8		dBm
TX output power (11n, MCS0)		16,8		dBm
TX output power (11n, MCS7)		13,8		dBm
TX spectral mask (CCK)		pass		
TX spectral mask (OFDM)		pass		
TX spectral mask (11n, 20M)		pass		
TX spectral mask (11n, 40M)		pass		
preamble length		Long/Short		

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Note: while WLAN is in radio off mode

BT RF characteristics	min.	typ.	max.	SPEC req-uirement	units
antenna I/F impedance		50			ohms
supply voltage (3.3V only)	3	3	3,6		V
basic rate RX sensitivity, 2402 Mhz		<-70		-70	mA
basic rate RX sensitivity, 2441 Mhz		<-70		-70	mA
basic rate RX sensitivity, 2480 Mhz		<-70		-70	mA
EDR RX sensitivity, 2402 MHz		< -70		-70	dBm
EDR RX sensitivity, 2441 MHz		< -70		-70	dBm
EDR RX sensitivity, 2480 MHz		< -70		-70	dBm
TX Output power, 2402MHz		2		-6 ~ +4	dBm
TX Output power, 2441MHz		2		-6 ~ +4	dBm
TX Output power, 2480MHz		2		-6 ~ +4	dBm
initial carrier frequency tolerance	>-10		<10	-75	khz
carrier frequency drift, DH3 (01010101)	>-10		<10	40	khz
carrier frequency drift, DH5 (01010101)	>-10		<10	40	khz
carrier frequency drift rate, DH3 (01010101)	>-10		<10	20	khz
carrier frequency drift rate, DH5 (01010101)	>-10		<10	20	khz
modulation characteristics, ΄Δf1 avg (DH1 ,00001111, kHz)	140		175		khz
modulation characteristics, ΄Δf2 max (DH1 ,00001111, kHz)		180		>115	khz
modulation characteristics, ΄Δf2 avg /Δf1 avg		1		>=0,8	khz
20 dB bandwidth		PASS	>900	1000	khz
TX output spectrum – frequency range (FL)	2401			2400	Mhz
TX output spectrum – frequency range (FH)			2481	2483,5	Mhz
maximum input level		>-20		-20	dBm
EDR maximum input level		>-20		-20	dBm
BT electrical characteristics	**min.**	**typ.**	**max.**	**SPEC req-uirement**	**units**
supply voltage (3.3V only)	3	3,3	3,6		V
TX supply current max.	115	125	135		mA
RX supply current max.	100	110	120		mA
S/W radio off	63	73	83		mA
idle mode	60	70	80		mA

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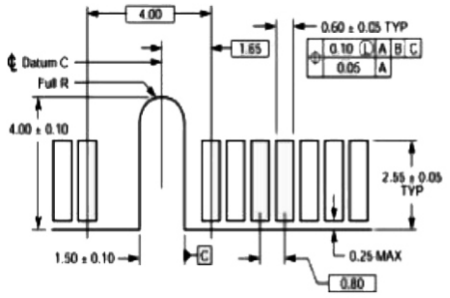
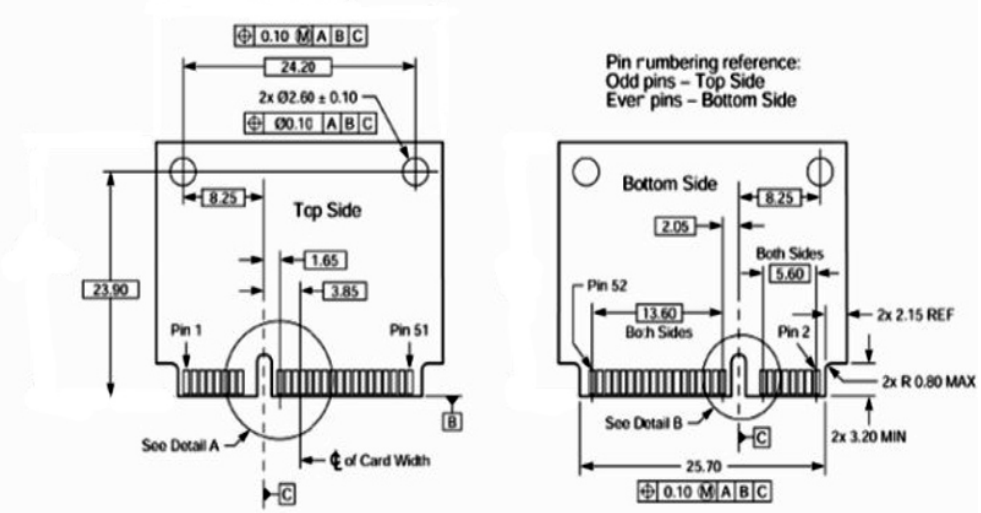
Mechanical drawing





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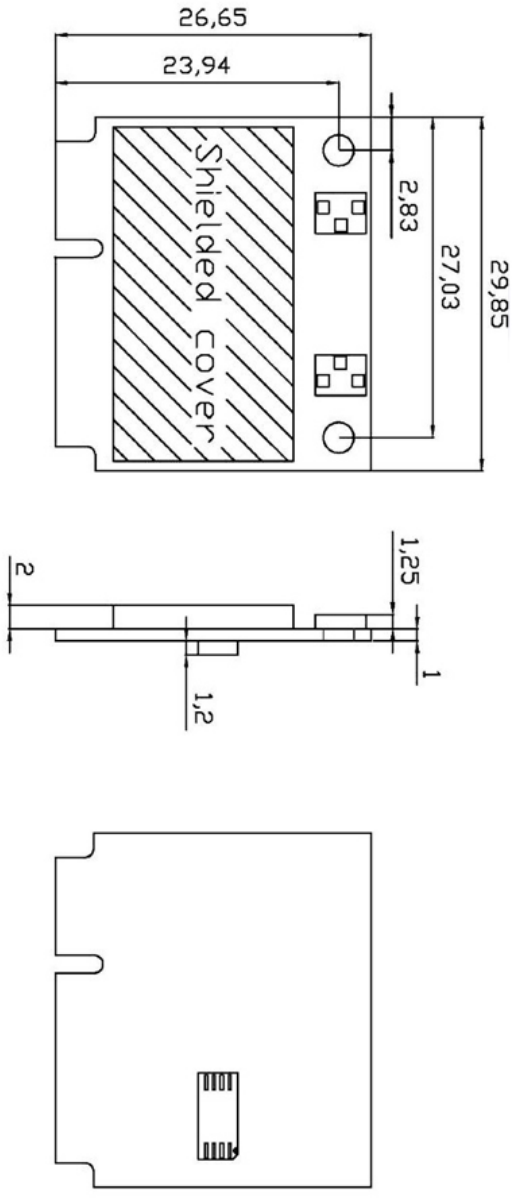
Mechanical photograph



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Connector:

2x antenna I-PEX/Hirose CL331-0471-0-10 (U.FL-R-SMT) or compliance

Wireless LAN LED status

LED Status	WLAN card activity
LED on	associated and authenticated but not transmitting or receiving
LED slow blink	scanning for AP
LED intermittent blink	activity proportional to transmitting/receiving speed
LED off	radio off

Bluetooth LED status

- Power up state: solid off
- Inquiry state: blinking 4 time/second
- Page state: blinking 1 time/second
- Connected state: blinking 2 time/second
- Transmit/receive state: blinking 2 time/second
- USB suspend: solid off
- Radio disable: solid off

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Pin definition

Pin#	name	Pin#	name
51	reserved*	52	+3,3V
49	reserved*	50	GND
47	reserved*	48	reserved*
45	reserved*	46	LED_WPAN#
43	reserved*	44	LED_WLAN#
41	reserved*	42	LED_WWAN#
39	reserved*	40	GND
37	reserved*	38	USB_D+
35	GND	36	USB_D-
33	PETp0	34	GND
31	PETn0	32	reserved*
29	GND	30	reserved*
27	GND	28	reserved*
25	PERp0	26	GND
23	PERn0	24	+3,3Vaux
21	GND	22	PERST#
19	reserved* (UIM_C4)	20	WLAN_disable# BT_disable#
17	reserved* (UIM_C8)	18	GND
	mechanical key		
15	GND	16	reserved*
13	REFCLK+	14	reserved*
11	REFCLK-	12	reserved*
9	GND	10	BT_APM
7	CLKREQ#	8	reserved*
5	reserved*	6	reserved*
3	reserved*	4	GND
1	WAKE#	2	3,3V

Note: Pin 20 is control pin of **WLAN and BT** radio enable/disable
Pin 44 LED_WLAN is the LED indicator signal for WLAN
Pin 46 LED_WPAN is the LED indicator signal for BT

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Operating conditions

Voltage range	3.3V +-0.3V
Operating temperature range	0°C - 65°C
Storage temperature range	-20°C - 85°C
Relative humidity during operating max.	95% (non-condensing)
Relative humidity during storage max.	95% (non-condensing)